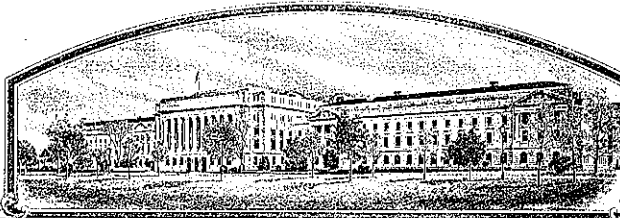


No.

9600115



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Minnesota Agricultural Experiment Station
United States Department of Agriculture, Agricultural Research Service

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, (THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR PRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR MARKETING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, *) TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTAIN SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE SEED. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

(*Waived, except that this waiver shall not apply to breeder seed, foundation seed, labeling requirements, and blending limitations)

WHEAT

'Verde'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirty-first day of July in the year of our Lord one thousand nine hundred and ninety-six.

Attest:

Marsha A. Stone
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Samuel J. Hittman
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION - PLANT VARIETY PROTECTION OFFICE

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate)		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Minnesota Agricultural Experiment Station		SBE 0437	Verde
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)		5. TELEPHONE (include area code)	FOR OFFICIAL USE ONLY PVPO NUMBER 960011 DATE 1-29-96 FILING AND EXAMINATION FEE 2450 DATE 1-29-96 CERTIFICATION FEE 300.00 DATE 3-21-96
University of Minnesota 190 Coffey Hall 1420 Eccles Avenue St. Paul, MN 55108		6. FAX (include area code) 612-625-0286	
7. GENUS AND SPECIES NAME	8. FAMILY NAME (Botanical)		
Triticum aestivum L.	Graminecia		
9. CROP KIND NAME (Common name) Hard red spring wheat			
10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) (Common name) Minnesota Agricultural Experiment Station			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION		12. DATE OF INCORPORATION	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS			14. TELEPHONE (include area code)
Robert H. Busch USDA, ARS, MWA, PSRU, University of Minnesota 411 Borlaug Hall, 1991 Upper Buford Circle St. Paul, MN 55108			612-625-1975
			15. FAX (include area code) 612-625-1268
16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)			
a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of the Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Applicant's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,600 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in a public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,450), made payable to "Treasurer of the United States" (Mail to PVPO)			
17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act?) <input checked="" type="checkbox"/> YES (If "yes," answer items 18 and 19 below) <input type="checkbox"/> NO (If "no," go to item 20)			
18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED	
20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES (If "yes," give names of countries and dates) <input type="checkbox"/> NO U.S. 15 Feb 1995 (as per letter) MHS			
21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.			
The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.			
Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT (Owner(s))		SIGNATURE OF APPLICANT (Owner(s))	
Marilyn DeLong			
NAME (Please print or type)		NAME (Please print or type)	
Marilyn DeLong			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Deputy Director MN Agricultural Experiment Sta.	1/25/96		1

16a. Origin and Breeding History of the Variety

Pedigree: MN7663/SBY354A

Where MN7663 is an elite Minnesota developed line,, closely related to 'Era', with the pedigree 'Kitt'/MN7222 (Era*2/MN6616M-'Chris' semidwarf mutant line). SBY354A is a Pioneer line with the pedigree of 'Waldron'/'Lundi'/'Justin'/'Argentina line 3 (pedigree unknown)/4/DeKalb'Tala'.

The cross of MN7663/SBY354A was made under the direction of Dr. Ian Edwards and Herb Schmidt, Pioneer Hybrid International spring wheat breeding program. The Pioneer program was closed in 1989 and seed of their program was distributed to North Dakota, South Dakota, and Minnesota. From that germplasm, SBE04370 was selected. The cross number associated with this line by Pioneer was retained throughout its testing at the University of Minnesota.

Disease testing for scab, stem rust and leaf rust was initiated in 1990 in inoculated nurseries and continued each generation. Yield testing was initiated in 1991 under the direction of Dr. R. Busch, USDA-ARS, University of Minnesota. SBE0437 was tested in advanced state yield trials from 1991 and in each following generation (Table 1). A wide area yield testing was conducted in the Uniform Regional Hard Red Spring Wheat Performance Nursery in 1993 and 1994. The variety trial data are over 15 total environments.

About 250 heads were selected for uniformity in 1992 and grown in the winter increase nursery in Arizona in the winter of 1992-1993 for purification. About 220 phenotypically similar rows were bulk harvested to form breeder's seed and increased at St. Paul, MN in 1993. A number of tall plants were found in this purified seed lot, and considerable rouging was required even though SBE0437 had appear to be relatively uniform and stable during our testing. This reselection resulted in about 2.6 talls in 10,000 plants and a stable frequency of talls has been observed in the increase fields after St. Paul in 1993. Although grown in isolation in Arizona, outcrossing may have occurred which was manifested in the tall off-types rouged in summer 1993 seed increase.

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16 b. Novelty Statement

Morphologically, Verde most closely resembles Norm, compared to other modern hard red spring wheat cultivars grown in the upper Midwestern USA.

Dr. Khan, Department of Cereal Science, North Dakota State University, Fargo, ND, 58105, at the request of Dr. R. Busch, was asked to obtain clear and useful gels for cultivar identification. The procedure used is published (Khalil Kahn, Richard Froberg, Truman Olson, and Linda Huckle. 1989. Inheritance of Gluten Protein Components of High-Protein Hard Red Spring Wheat Lines Derived from *Triticum Turgidum* var. *dicoccoides*. Cereal Chem 66 (5):397-401). Dr. Khan used PAGE gel electrophoresis to determine the gliadin fraction of the gluten protein. It is the end product of the cultivar's genetic constitution that produces the gliadin fraction. These gliadin bands are called genetic markers and are commonly used to discriminate among cultivars. They are not affected by environment, like many morphological traits which are phenotypic measures, and represent consistently repeatable genotypic differences.

Dr. Busch requested gliadin fractionation to provide genetic differentiation among the following varieties for Plant Variety Protection: Era, Norm, Wheaton, Marshall, Bergen, Minnpro, Prospect, Vance, Gus, Nordic 2370, 2371, Dalen and Grandin. Verde may be distinguished from the leading cultivar in the spring wheat region, 2375, morphologically by having a twisted flag leaf prior to head at the boot stage and by being at least 3 days later to head.

Verde may be differentiated from Era since it possess bands 12 and 14 which Era lacks (Fig. 1). Verde may be differentiated from Norm, which it looks most alike phenotypically, by Verde's absence of bands 6, 7, and 9 - which Norm possesses, and the possession of the bands 5, 8, 12, and 14 which Norm lacks. Verde possesses band 8 and 12 which Wheaton lacks, and Wheaton possesses bands 9 and 7 that Verde lacks. Verde may be differentiated from Marshall primarily by the presence of band 13 that Marshall lacks. Verde possesses band 1 and 13 which Bergen lacks. Verde may be differentiated from Minnpro since it possesses bands 12 and 14 which Minnpro lacks. Verde differs from Prospect by the presence of bands 1 and 13 and the absence of bands 4 and 7. Verde differs from Vance by the presence of bands 8 and 13, and the absence of bands 4 and 10. Verde possesses bands 1, 12, and 14 which differentiate it from Gus, while Gus has band 4 which Verde lacks. Verde is differentiated from Nordic by the presence of bands 1 and 14, and the absence of band 4 which Nordic possesses. Verde may be differentiated from 2370 and 2371 since it has band 1 which they lack. Further, Verde lacks band 4 which both 2370 and 2371 possess. Verde possesses band 12 which Dalen and Grandin lack. Further, Grandin possesses band 4 which Verde lacks.

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16c. Objective Description of the Variety

Verde is a hard red spring wheat, *Triticum aestivum* L. Agronomic data collected from 15 location-years from Minnesota Variety Trials on Verde and selected, presently or recently grown varieties in the Upper-Midwest from 1992 through 1994 are presented in Table 1. A combined analysis of variance of each environment and over all environment was conducted. A FLSD0.05 for each trait was computed from the variety x environment interaction from the combined analysis of variance except for the leaf disease rating. This test assumes that the environments are random, and provides a conservative test for differences among the varieties. Norm, Bergen, Vance, Dalen, Minnpro, and Prospect were grown by producers at the time of these tests and were the best varieties available. However, all were scab (*Fusarium* head blight) susceptible and only those varieties with moderate susceptibility are being grown in 1995. 2375 is grown on approximately 50% of the Minnesota acreage, primarily because it has the highest resistance to scab available in released varieties. At least 7 of the 15 environments in Table 1 had scab epidemics, and in 1993 all locations had scab. In 1992, scab was not present, while in 1994, scab was very severe at three locations. Verde had comparable yield to 2375, Bergen and Norm, and significantly better than the other varieties. Verde differed significantly from only Minnpro and Vance for test weight (Table 1).

Verde is significantly earlier to head than Marshall, similar to Vance and Minnpro, and later than the rest of the varieties. Verde differs significantly for plant height from Stoa, a tall variety, and from two other shorter semidwarf varieties, Bergen and Dalen. Verde lodges less than 2375, Stoa, and Vance. In the Uniform Regional Hard Red Spring Wheat Nursery 1993-1994 (40 environment-years), Verde yielded 5% and 10% more than the long term check varieties, Stoa and Era, respectively.

Verde has been highly resistant to all tested races of stem rust (caused by *Puccinia graminis* Pers:Pers) both in the field and in the greenhouse in seedling growth stage. Verde has also been resistant to moderately resistant to all naturally occurring leaf rust (caused by *P. reconditia* Rob. ex Desm.) races in adult field test. Leaf rust race seed tests of Verde indicated that it possess Lr13 and Lr34 adult plant leaf rust resistant genes, similar to Marshall, Wheaton, Norm, and Era.

Verde has long, wide, white glumes with an elevated shoulder and an acuminate beak. The spike is awned, mid-dense, and tapering. The kernel is red in color, elliptical to ovate, mid-size, with rounded cheeks and a narrow, mid-deep crease. The brush has no collar and is medium in length. Verde displays at very noticeable twisted flag leaf prior to heading in the boot stage of growth.

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S) Minnesota Agricultural Experiment Station	FOR OFFICIAL USE ONLY 9600115
ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) University of Minnesota 220 Coffey Hall 1420 Eccles Avenue St. Paul, MN 55108	PVPO NUMBER
	VARIETY NAME Verde
	TEMPORARY OR EXPERIMENTAL DESIGNATION SBE 0437

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. or when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____
Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

1

1=Common

2=Durum

3=Club

4=Other (SPECIFY) _____

2. VERNALIZATION:

1

1=Spring

2=Winter

3=Other (SPECIFY) _____

3. COLEOPTILE ANTHOCYANIN:

1

1=Absent

2=Present

4. JUVENILE PLANT GROWTH:

3

1=Prostrate

2=Semi-erect

3=Erect

5. PLANT COLOR (boot stage):

2

1 = Yellow-Green

2 = Green

3 = Blue-Green

6. FLAG LEAF (boot stage):

1

1 = Erect

2 = Recurved

2

1 = Not Twisted

2 = Twisted

7. EAR EMERGENCE:

0 1

Number of Days Earlier Than Marshall

0 0

Number of Days Later Than Chris

8. ANTER COLOR:

1

1 = YELLOW

2 = PURPLE

9. PLANT HEIGHT (from soil to top of head, excluding awns):

cm Taller Than _____

1 0

cm Shorter Than Chris

10. STEM:

A. ANTHOCYANIN

☒ 1 = Absent 2 = Present

B. WAXY BLOOM

☒ 2 = Absent 2 = Present

C. HAIRINESS (last internode of rachis)

☒ 1 = Absent 2 = Present
D. INTERNODE (SPECIFY NUMBER) 6
☒ 1 = Hollow 2 = Semi-solid 3 = Solid

E. PEDUNCLE

☐ 1 = Absent 2 = Present

☐ cm Length
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11. HEAD (at Maturity):

A. DENSITY

☒ 2 = Lax 2 = Middense 3 = Dense

B. SHAPE

☒ 1 = Tapering 2 = Strap 3 = Clavate 4 = Other (SPECIFY) _____

C. CURVATURE

☒ 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS

☒ 4 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

12. GLUMES (at Maturity):

A. COLOR

☒ 1 = White 2 = Tan 3 = Other (SPECIFY) _____

B. SHOULDER

☒ 5 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK

☒ 3 = Obtuse 2 = Acute 3 = Acuminate

D. LENGTH

☒ 3 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

E. WIDTH

☒ 3 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE

☒ 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK

☒ 1 = Rounded 2 = Angular

C. BRUSH

☒ 2 = Short 2 = Medium 3 = Long

☒ 1 = Not Collared 2 = Collared

D. CREASE

☒ 2 = Width 60% or less of Kernel
 2 = Width 80% or less of Kernel
 3 = Width Nearly as Wide as Kernel

☒ 2 = Depth 20% or less of Kernel
 2 = Depth 35% or less of Kernel
 3 = Depth 50% or less of Kernel

6

13. SEED: (continued)

E. COLOR

1 = White

2 = Amber

3 = Red

4 = Other (SPECIFY) _____

F. TEXTURE

1 = Hard

2 = Soft

G. PHENOL REACTION (see instructions):

1 = Ivory

2 = Fawn

3 = Light Brown

4 = Dark Brown

5 = Black

14. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

Stem Rust (*Puccinia graminis* f. sp. *tritici*)

Resistant to all prevalent races

Leaf Rust (*Puccinia recondita* f. sp. *tritici*)

Resistant to all prevalent races

Stripe Rust (*Puccinia striiformis*)Loose Smut (*Ustilago tritici*)Tan Spot (*Pyrenophora tritici-repentis*)Flag Smut (*Urocystis agropyri*)Halo Spot (*Selenophoma donacis*)Common Bunt (*Tilletia tritici* or *T. laevis*)

Septoria nodorum (Glume Blotch)

Dwarf Bunt (*Tilletia controversa*)

Septoria avenae (Speckled Leaf Disease)

Karnal Bunt (*Tilletia indica*)

Septoria tritici (Speckled Leaf Blotch)

Powdery Mildew (*Erysiphe graminis* f. sp. *tritici*)Scab (*Fusarium* spp.)

"Snow Molds"

"Black Point" (Kernel Smudge)

Common Root Rot (*Fusarium*, *Cochliobolus* and *Bipolaris* spp.)

Barley Yellow Dwarf Virus (BYDV)

Rhizoctonia Root Rot (*Rhizoctonia solani*)

Soilborne Mosaic Virus (SBMV)

Black Chaff (*Xanthomonas campestris* pv. *translucens*)

Wheat Yellow (Spindle Streak) Mosaic Virus

Bacterial Leaf Blight (*Pseudomonas syringae* pv. *syringae*)

Wheat Streak Mosaic Virus (WSMV)

Other (SPECIFY) _____

Other (SPECIFY) _____

Other (SPECIFY) _____

Other (SPECIFY) _____

Other (SPECIFY) _____

Other (SPECIFY) _____

Other (SPECIFY) _____

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

Hessian Fly (*Mayetiola destructor*)

☐ 0

Other (SPECIFY) _____

☐

Stem Sawfly (*Cephus* spp.)

☐ 0

Other (SPECIFY) _____

☐

Cereal Leaf Beetle (*Oulema melanopa*)

☐ 0

Other (SPECIFY) _____

☐

Russian Aphid (*Diuraphis noxia*)

☐ 0

Other (SPECIFY) _____

☐

Greenbug (*Schizaphis graminum*)

☐ 0

Other (SPECIFY) _____

☐

Aphids

☐ 0

Other (SPECIFY) _____

☐

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

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16d. Exhibit D, Additional Description of the Variety

Verde was evaluated by industry in large plot trials conducted by the Spring Wheat Quality Council in 1993 and 1994, Tables 2 and 3. A list of the cooperating units which evaluated quality is included in an appendix. Bread-making quality of Verde was tested beginning in 1991 on a limited basis. Comparisons with recommended varieties was not available until Verde was advanced in generations far enough to be entered into the Minnesota Variety Trials in 1993. Table 4 provides small plot quality data from the variety trial in Minnesota from 1993 through 1994 from the USDA Spring Wheat Quality Laboratory, Fargo, ND 58105.

In the 1993 Spring Wheat Quality Council Trials, Verde was judged comparable overall to Grandin, the high quality check variety categories 1-20 overall comparison (Table 2). In the 1994 tests, Verde was judged to be slightly lower in overall rating, probably because it is a little lower in protein and bake absorption, but still acceptable.

Data from the USDA Quality Laboratory from 1993 and 1994, combined over 11 locations, indicated that Verde is comparable overall to the other released varieties with excellent loaf volume, strong mixing, high flour water absorption but some what lower in protein. Overall score from 1993 indicated its quality was promising.

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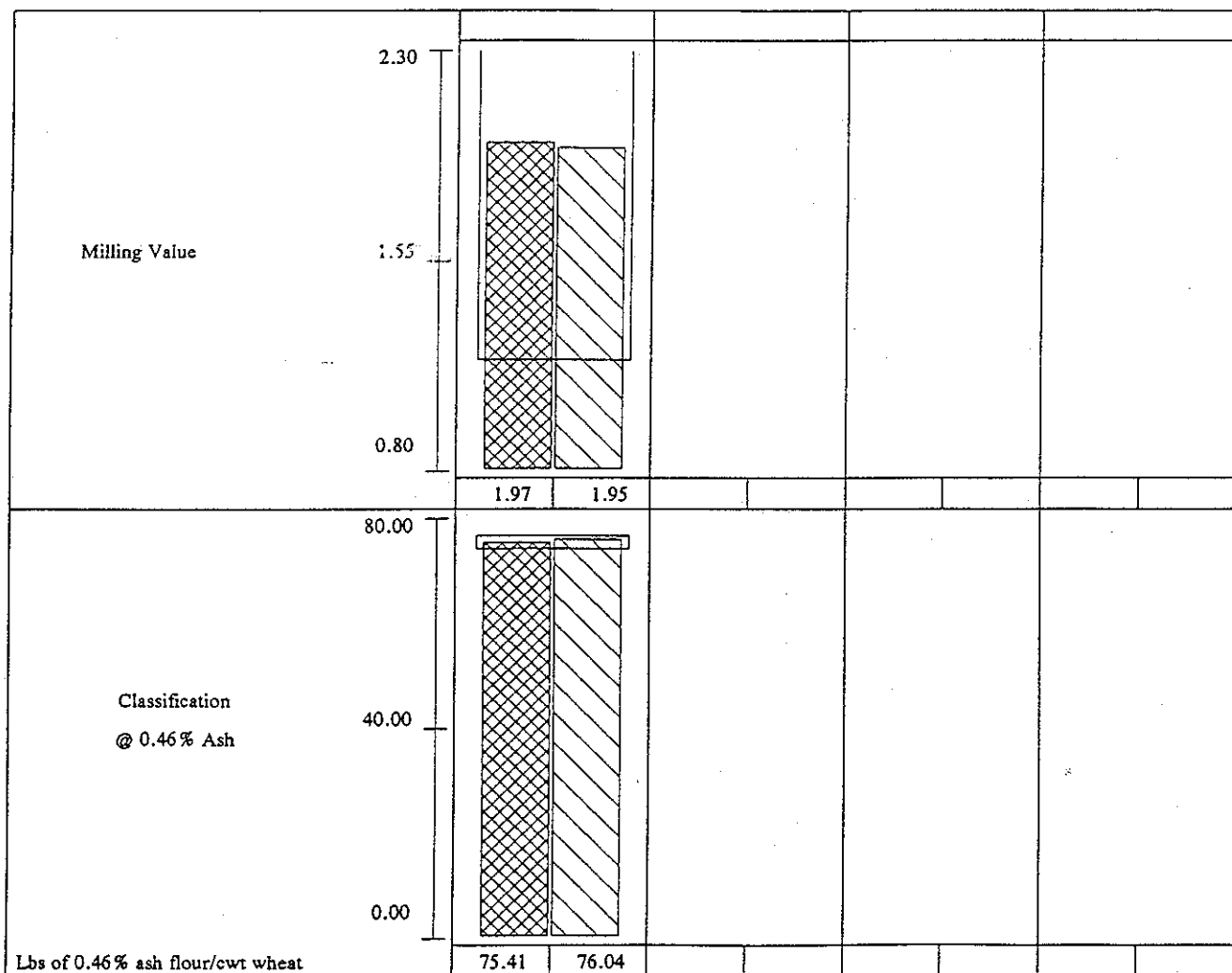
TABLE 1 MN VARIETAL TRIALS FOR VERDE DESCRIPTION 1992-93-94 PVP

VARIETY OR STATE NO. NO. LOCS:	YIELD BU/AC	TWT LB/BU	HD DAYS	HT CM	LD	DS
	15	15	14	13	13	1
VERDE	54.6	57.1	28	82	2.5	5.3
NORM	51.9	56.1	27	82	2.4	4.2
MARSHALL	45.9	56.6	29	80	2.5	7.1
2375	53.8	58.7	25	80	3.3	7.3
GRANDIN	47.1	58.0	25	84	2.6	8.3
STOA	50.3	56.9	26	91	3.1	6.4
BERGEN	52.7	56.4	27	76	2.1	6.1
VANCE	46.8	55.4	28	81	3.1	7.0
DALEN	50.0	57.0	25	76	2.5	6.0
MINNPRO	45.0	54.4	28	83	2.9	8.2
PROSPECT	49.8	56.6	27	82	2.2	7.3
MEANS:	49.8	56.7	27	81	2.7	6.7
TESTS	YIELD	TWT	HD	HT	LD	
F-test:	5.3	14.3	17.3	13.4	3.9	
LSD:	4.0	0.9	0.8	3.1	0.6	
CV:	11.0	2.1	4.2	5.0	27.6	

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SBE0437

Location		Crookston							
Variety		Check	K-8	Check		Check		Check	
1	Wheat Protein %	15.6	14.4						
2	Flour Protein %	14.6	13.5						
3	Test Weight lb/bu	56.9	56.2						
4	1000 Kernel Weight grams	29.4	27.2						
5	Large Kernel %	42	33						
6	Small Kernel %	2	1						
7	Hardness	74.0	79.0						
8	Wheat Ash %	1.75	1.76						
9	Wheat Falling No. sec	392	394						
10	Flour Extraction %	70.40	73.60						
11	Flour Ash %	0.45	0.46						
12	Lbs .46% Ash Flour / cwt wheat	75.41	76.04						
13	Farinograph:								
	Absorption %	62.0	58.5						
	Arrival Time	2.0	2.5						
	Peak	6.4	6.9						
	Stability	12.3	12.3						
	M.T.I.	28	23						



* Difference is statistically significant at the 5% level.

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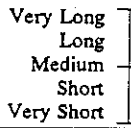
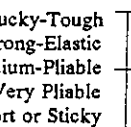
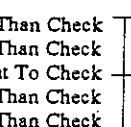
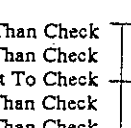
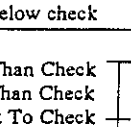
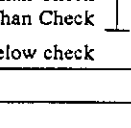
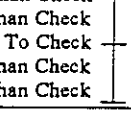
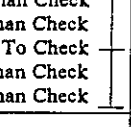
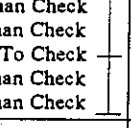
Location		Crookston							
Variety (SBE0437)		Check	K-8	Check		Check		Check	
14	Bake Absorption (14% M.B.)	62.2	59.7*						
15	Loaf Volume (% of Check)	100.0	97.7						
16	Mixing Requirement								
17	Dough Characteristics								
18	Mixing Tolerance								
19	Internal Crumb Color								
Reason for ranking below check									
20	Internal Grain and Texture								
Reason for ranking below check									
Categories 1-2: Protein									
Categories 3-13: Milling									
Categories 14-20: Baking									
Categories 1-20: Overall Comparison									

Table 3.

1994 HARD SPRING WHEAT TECHNICAL COMMITTEE

9600115

VARIETY: SBE0437

Sample Code:	B-CK	B-1	C-CK	C-1	K-CK	K-1	M-CK	M-1	Average	Average
									Grandin	SBE0437
Wht Protein(14%mb):	16.1	13.8	14.5	13.1	14.5	13.1	16.1	14.7	15.3	13.7
Wheat Ash(14%mb):	1.72	1.63	1.67	1.68	1.69	1.71	1.55	1.45	1.66	1.61
Test Weight(lb/bu):	57.3	58.3	59.8	59.1	60.4	59.7	62.0	62.4	59.9	59.9
1000-KWT(gram):	28.2	28.4	31.6	28.7	30.7	29.6	36.4	35.2	31.7	30.5
Large Kernels(%):	49	52	54	51	58	54	69	70	58	57
Small Kernels(%):	2	2	2	3	2	2	1	0	2	2
NIR Hard:	90.0	88.0	95.0	107.0	97.0	81.0	90.0	86.0	93	91
Kernel Vit(%):	60.9	43.7	75.6	60.7	80.3	64.0	93.3	90.2	77.5	64.7
SKWCS HI:	78.5	70.8	81.4	78.6	85.2	84.3	70.2	61.6	78.8	73.8
Wht FN(sec):	352	375	384	388	371	384	363	400	368	387
FI Protein(14%mb):	15.2	12.8	13.7	12.1	13.9	12.3	15.3	14.0	14.5	12.8
FI Ash(14%mb):	0.46	0.40	0.43	0.44	0.47	0.50	0.41	0.37	0.44	0.43
FI Ext(%):	70.7	72.8	72.6	73.6	73.5	73.7	72.3	75.1	72.3	73.8
# .46 Ash FI/cwt Wht:	73.9	75.7	74.6	75.0	73.5	68.9	76.9	78.5	74.7	74.5
Mill Value(\$):	1.89	1.98	1.91	1.93	1.93	1.83	2.07	2.17	1.95	1.98
Farino Abs(14%mb):	62.4	57.8	61.1	56.9	60.5	58.2	66.1	61.1	62.5	58.5
Farino Arrival Time(min):	3.0	2.8	2.8	2.2	2.3	2.5	4.2	4.0	3.1	2.9
Farino Peak Time(min):	6.5	6.0	5.2	4.2	4.5	3.8	7.6	6.7	6.0	5.2
Farino Stability(min):	11.9	10.7	8.1	5.9	8.1	4.4	12.4	8.3	10.1	7.3
Farino MTI(BU):	14	19	29	45	28	47	9	27	20	35
Bake Asorption(14% mb):	62.4	59.3	60.3	57.6	60.4	58.3	64.1	61.5	61.8	59.2
Bake Rating:	3.8	2.4	2.8	1.8	2.8	1.7	4.5	3.3	3.5	2.3
Bake Mix Time Actual:	11.0	8.5	8.5	5.9	8.2	5.4	11.5	9.6	9.8	7.3
Bake Mix Time Rating:	3.9	3.1	3.0	2.0	2.5	1.4	4.2	3.5	3.4	2.5
Mix Tolerance Rating:	3.8	3.3	2.5	1.8	2.7	1.6	4.4	3.4	3.4	2.5
Out of Mixer Rating:	3.6	2.8	3.3	2.0	2.9	2.4	3.9	3.6	3.4	2.7
Out of Mixer Describe:	2.1	1.8	1.8	1.4	1.8	1.6	2.3	2.0	2.0	1.7
At Make Up Rating:	3.9	2.8	2.8	2.1	2.5	2.0	4.3	3.7	3.4	2.6
At Make Up Describe:	2.2	1.8	1.5	1.3	1.5	1.3	2.5	2.2	1.9	1.6
Loaf Volume Rating:	3.8	4.1	3.4	3.1	3.0	2.1	4.8	4.4	3.7	3.4
Crumb Color:	2.7	4.5	2.9	3.8	3.1	3.1	3.8	4.8	3.1	4.1
Crumb Grain:	3.4	4.2	3.2	3.1	3.5	2.6	3.9	3.8	3.5	3.4
Crumb Texture:	3.5	3.6	2.9	3.0	3.4	2.1	3.8	4.3	3.4	3.3
Overall Rating:	3.3	3.6	2.7	2.7	3.0	2.2	4.0	3.7	3.2	3.0

Rating Scores : 0 3 6

Bake Absorption : Low ----- High

Bake Mix Time : Short ----- Long

Mixing Tolerance : Weak ----- Strong

Out Of Mixer : Weak ----- Bucky

At Make Up : Weak ----- Bucky

Loaf Volume : Low ----- High

Crumb Color : Yellow Grey Dull Creamy Bright White

Crumb Grain : Irregular,open,thick Open, thick Close,elongated,fine

Crumb Texture : Harsh Coarse Silky

Overall Rating : Poor ----- Excellent

Out of Mixer Describe:

1. Sticky - Weak
2. Medium - Pliable
3. Tough - Bucky

Out of Mixer Describe:

1. Sticky - Weak
2. Medium - Pliable
3. Tough - Bucky

9600115

TABLE 4. Mean quality data for Verde and recommended hard red spring wheat varieties grown in a total of 14 environments in Minnesota in 1993-94.

	Protein	Flour yield	Flour water absorption	Mixogram pattern ⁽¹⁾	Loaf volume	Score ⁽²⁾ ⁽³⁾
	%	%	%	1 - 11	cc	1 - 4
Marshall	14.6	67.6	55.9	2.0	188.8	2.2
Minnpro	14.5	66.5	58.6	3.0	202.0	3.4
Vance	15.3	67.0	59.0	3.0	201.8	2.9
Norm	14.2	67.6	56.5	2.5	186.5	2.4
Stoa	15.2	66.6	59.0	2.8	192.0	3.0
Grandin	15.2	67.4	58.0	3.3	199.3	3.3
Prospect	14.8	66.3	57.0	2.8	198.5	2.0
Dalen	14.7	66.8	57.1	3.0	193.3	2.5
Bergen	14.1	68.2	58.6	3.3	195.0	2.2
2375	14.9	68.7	58.5	3.3	203.0	3.3
Verde	14.3	67.5	59.8	3.3	217.0	3.0

⁽¹⁾ 1= very weak; 11= extremely strong

⁽²⁾ overall score: 1= no promise; 2= little promise; 3= some promise; 4= good promise

⁽³⁾ scoring was discontinuing in 1994

APPENDIX

1994 WHEAT QUALITY PROGRAM REPORT

Introduction

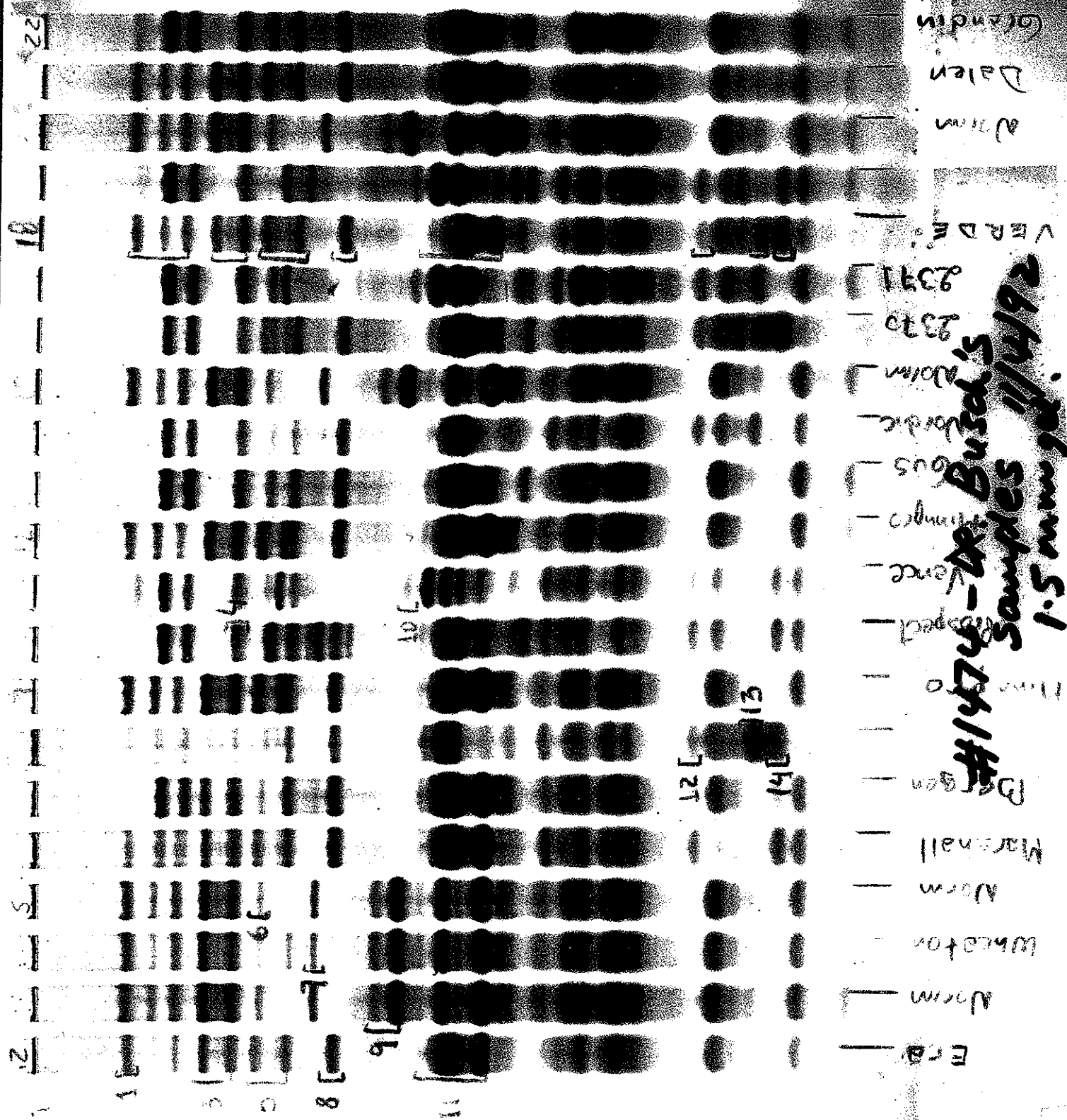
The Wheat Quality testing program of the Hard Spring Wheat Technical Committee (formerly the Spring Wheat Quality Advisory Council) is designed to provide quality data relating the milling and baking properties of experimental wheat lines grown and tested during the 1994 crop year.

The data in this report was developed under code and provided to the Committee by the United States Department of Agriculture Hard Red Spring and Durum Wheat Quality Laboratory, Fargo, North Dakota 58105.

Baking data, not disclosing the source of identity of the flour samples tested, was independently compiled and reported according to a uniform testing system by the following cooperating laboratories:

ADM Milling Company	Olathe, Kansas
Bay State Milling Company	Winona, Minnesota
Cargill Flour Milling	Wichita, Kansas
Cereal Food Processors, Inc.	Wichita, Kansas
ConAgra, Inc.	Omaha, Nebraska
Atochem North America	Buffalo, New York
General Mills, Inc.	Minneapolis, Minnesota
Grain Research Laboratory	
Canadian Grain Commission	Winnipeg, Canada
Montana State University	
Dept. of Plant & Soil Science	Bozeman, Montana
North Dakota State University	
Dept. of Cereal Science	Fargo, North Dakota
North Dakota Mill & Elevator	Grand Forks, North Dakota
The Roman Meal Company	Tacoma, Washington
USDA-ARS Hard Red Spring & Durum	
Wheat Quality Laboratory	Fargo, North Dakota

Fig. 1
 Gladiolus
 BAND
 for
 Verde
 PV P



16e. Exhibit E. Statement of the Basis of Applicant's Ownership

The Pioneer Spring Wheat Breeding Program was discontinued in 1989, and germplasm was distributed to Minnesota, North Dakota, and South Dakota. SDB0437 had been in preliminary test by Pioneer, but was not an elite line. All testing, reselection and increasing were conducted by the joint USDA-ARS and Minnesota Agricultural Experiment Station spring wheat improvement program. The original cross and selection were conducted under direction of Dr. Ian Edwards, Pioneer, and testing and reselection were conducted under direction of Dr. Robert Busch, Research Geneticist, USDA-ARS and employees of the University of Minnesota, Minnesota Agricultural Experiment Station. Registration of Verde acknowledges Pioneer's research effort, but complete ownership of this cultivar is claimed by USDA-ARS and Minnesota Agricultural Experiment Station.



United States
Department of
Agriculture

Agricultural
Marketing
Service

Science
Division

Plant Variety Protection Office
NAL Building, Room 500
10301 Baltimore Blvd.
Beltsville, MD 20705-2351

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 9600115
Variety and Kind: 'Verde', WHEAT

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on the Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived, except that this waiver shall not apply to breeders seed, foundation seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

Minnesota Agricultural Experiment Station

United States Department of Agriculture, Agriculture Research Service

6/20/96
(Date)

J. B. Mc. Jan
(Signature)